

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A process for the preparation of a solid carbon charcoal residue comprising:
  - a) pyrolyzing a biomass or other carbonaceous material at a temperature between 350°C to 500°C to produce a pyrolytic gas comprising volatile organic compounds and a solid carbon charcoal residue; and
  - b) contacting all or a portion of the solid carbon charcoal residue, ammonia, and water with an off-gas stream of a combustion or other process, wherein the gas stream comprises carbon dioxide, sulfur dioxide or nitrous oxide to reduce the discharge of carbon dioxide, sulfur dioxide or nitrous oxide into the atmosphere;
  - c) allowing the charcoal residue, ammonia, water and off gases to be held in intimate contact for at least 5 seconds;
  - d) processing the gas stream to separate a hydrogen stream;
  - e) optionally combining the hydrogen stream with nitrogen to produce ammonia or ammonium nitrate or other nitrogen compounds;
  - f) forming ammonium bicarbonate in the charcoal pores and on its surface to produce a charcoal fertilizer, and optionally forming ammonium salts of nitrogen oxides and sulfur dioxide in contact with the charcoal fertilizer, to thereby produce a solid carbon charcoal residue comprising a slow release sequestering soil amendment fertilizer;
  - g) wherein the solid carbon charcoal residue is in the form of a solid powder and or granular material suitable for large scale agricultural applications; and
  - h) wherein optionally the charcoal residue comprises a coating to control the rate of release of the compounds, and wherein the coating is optionally selected from the group consisting of gypsum, plaster, sulfur, or polymers which can dissolve or create a permeable layer when placed in the soil.

2. (Currently Amended) ~~A~~ The process of Claim 1 for the preparation of a solid carbon charcoal residue wherein step a) of pyrolyzing comprises ~~comprising~~:  
pyrolyzing a biomass or other carbonaceous material at a temperature range of between 350°C to 500°C for no more than 2 minutes ~~to maximize the formation of surface acid groups and preferential adsorption of a base that is optionally ammonia.~~
3. (Currently Amended) The process as in Claim 1 where the temperature of the solid carbon charcoal residue during step a) exceeds 500°C and where the temperature remains above 600°C for greater than 10 minutes ~~to minimize the production of surface acids groups.~~
4. (Currently Amended) The process as in ~~Claims~~ Claim 1, 2 or 3 wherein the residue is further processed under various conditions, including but not limited to pressure, mechanical actions, heat, steam, oxygen, acid, carbon dioxide, addition of fertilizer components, which are optionally potassium, magnesium, ammonium sulfate, ammonium nitrate, or micro mineral nutrients including iron molybdenum minerals, to optimize the residue for specific applications as an adsorbent and carrier of other materials.
5. (Previously Presented) The process as in Claim 1, wherein the gas is further processed to extract a purified hydrogen stream, using ceramic membranes, steam reforming or catalytic reforming.
6. (Previously Presented) The process as in Claim 5, optionally further comprising separating unpurified hydrogen from carbon dioxide, nitrogen or other parasitic gases.
7. (Currently Amended) The process in accordance with ~~Claims~~ Claim 1, 5 or 6, further comprising combining the hydrogen stream with nitrogen to produce ammonia or ammonium nitrate or other nitrogen compounds.
8. (Currently Amended) The process in accordance with ~~Claims~~ Claim 1, 2, or 3 ~~or 4~~, wherein all or a portion of the solid carbon charcoal residue, ammonia, and water are injected or brought into intimate contact with an off-gas stream of a combustion or other

process where such gas stream has a concentration of sulfur dioxide or nitrous oxide to reduce the discharge of these materials from the off-gas stream into the atmosphere.

9. (Currently Amended) ~~A-~~The process according to Claim 1 for the preparation of a solid carbon charcoal residue comprising:

pyrolyzing a biomass or other carbonaceous material at a temperature between 350°C to 500°C to produce a pyrolytic gas comprising volatile organic compounds and a solid carbon charcoal residue; and

contacting all or a portion of the solid carbon charcoal residue, ammonia, and water with carbon dioxide.

10. (Previously Presented) The process in accordance with Claim 1 or 8, where the charcoal residue and ammonia, water and off gases are held in intimate contact for at least 5 seconds.

11. (Cancelled).

12. (Previously Presented) The process as in Claim 1 or 8 wherein a chemical reaction further occurs to allow the formation of ammonium salts of nitrogen oxides and sulfur dioxide to be formed in contact with  $\text{NH}_4\text{HCO}_3$ -charcoal fertilizers.

13. (Withdrawn)

14. (Currently Amended) A process in accordance with Claim 1 ~~Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12~~ wherein compounds beneficial for plant growth are adsorbed onto the internal pore structure of the carbon charcoal residue to form a material which provides a slow release of the compounds.

15. (Withdrawn)

16. (Withdrawn)

17. (Currently Amended) A solid carbon residue produced by a process of ~~claims~~ Claim 1, 2, 7 or 9.

18. (Previously Presented) The process of claim 1, wherein the step of contacting the solid carbon charcoal residue, ammonia, and water with the gas stream further comprises at least one of the conversion of carbon dioxide to ammonium bicarbonate, the conversion of sulfur dioxide to ammonium sulfate, and the conversion of nitrous oxide to ammonium nitrate.

19-20. (Withdrawn)